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U. S. Geological Exploration of the Fortieth Parallel, Clarence King, Geologist-in-charge. Vol. 2, Descriptive Geology, by Arnold Hague and S. F. Emmons. Illustrated by 26 plates. Washington, 1877. 4° pp. 890. Vol. 4, Part 1. Palæontology, by F. B. Meek. Part 2, Palæontology, by James Hall and R. P. Whitfield. Part 3, Ornithology, by Robert Ridgway. 24 plates. Washington, 1877. 4° pp. 669.

The Louisville Limestones. Note on the Hydraulic Beds and associated Limestones at the Falls of the Ohio. Palæontology of New York, V. Part 2. Advance sheets. Nov. 1877. 4° pp. 16.

Supplement to the second edition of Acadian Geology, containing additional facts as to the geological structure, fossil remains and mineral resources of Nova Scotia, New Brunswick and Prince Edward Island, by J. W. Dawson, F. R. S., etc. London. MacMillan & Co., 1878. 8° pp. 102.

Sur la Découverte d'un orthoptère coureur de la Famille des Phasmienis dans les Terrains supra-houillers de Commeny. *Protophasma dumasii*. Par M. Charles Brogniart. 8° pp. 4.

The Distribution of the Till in New Hampshire, Massachusetts and Long Island. By Warren Upham. From the third volume of the Final Report upon the Geology of New Hampshire. Concord, N. H. 1877. 8° pp. 24.

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GENERAL NOTES.

BOTANY.

CLEISTOGAMOUS FLOWERS OF *DANTHONIA*.—I have been much interested in the article in the April number of the *NATURALIST*, by C. G. Pringle, on the Cleistogamous Flowers of *Danthonia*. *D. spicata* is very common in all our dry, sterile, or rocky woods; occasionally some bunches occur in moist ground, and these can readily be pulled out by the roots, with no disposition to separate at the lower joints; but when the plant grows in dry ground, as it usually does, the culms separate near the root without much difficulty. This I have always considered was due not so much to the plant itself, as to the place of growth; the firm hold the fibrous roots have to the ground, would cause a separation when the plant is pulled vigorously, many others act the same way. With *Danthonia sericea*, however, my experience has been very different from that of Mr. Pringle. This species is quite frequently met with in the dry loose sand in the Pine-barren region of New Jersey, growing in little tufts; in that respect somewhat different in habit from *D. spicata*. Last June whilst botanizing near Egg Harbor City, in this State, I found a large number of these tufts, each having from 6 to 20 culms, and so brittle or readily disarticulating at the lower joints, that it was with great difficulty that I could secure a decent specimen; on endeavoring to pull up the plant, in every instance the separation occurred; the only way to succeed was to dig out the roots without touching the stem at all, and even then the effort to shake off the loose sand, often caused the culm to break away. Our specimens of *D. spicata* very frequently have a few flowers in the axils, but I have never seen any in *D. sericea*.—Isaac C. Martindale, Camden, N. J.

MEANS BY WHICH PLANTS ARE PROTECTED FROM ANIMALS AND UNFAVORABLE WEATHER, ETC.—Under this title Otto Kuntze has published a work which has been reviewed in Trimen's *Journal of*

Botany. From animals plants are protected by possession of runners ; by close growth (thus effectually banishing animals too large to force a passage) ; by growing under sheltering bushes (this applies of course to herbs) ; by twining habits ; by epiphytic habits ; by presence of spines and thorns (protection against grazing birds) ; by all forms of trichomes (these, besides hindering browsers, prevent crawling up of insects, &c.) ; by production of organs and tissues suitable to ant-habitation ; by growing in water, and by having leaves adapted to hold water at their bases ; by rings of hairs on stems, &c. (against crawling insects) ; by slippery, waxy surfaces ; by milky sap (this, besides being poisonous to grazing animals, by its exudation impedes the movements of small climbing creatures) ; by presence of ethereal oil in all parts, including the seed (drives away insects) ; by corky tissues ; by possession of leathery leaves which may be distasteful to grazing animals ; by development of tubers, bulbs and allied structures ; by revolution of leaf margins and of corolla-tips (renders climbing difficult to ants) ; by the absence of chlorophyll ; by poisonous or bitter principles developed chiefly in seeds, these also being protected by their hardness, leathery consistence and small size.

Protections against unfavorable weather are — runners (which support plants against over-weight of snow in alpine and polar regions, and by admitting of a complete covering of snow are enabled to resist the otherwise fatal effects of frost) ; aerial roots — props against land-storms and dash of the waves ; gregarious habits lessening the force of the winds, a result accomplished also by the horizontal position of the branches, by development of small scaly leaves, and by possession of leafy crowns, deep roots and strong or slim stems ; hairy clothing, which protects against cold, rain and undue transpiration, and also intercepts and retains rain and dew ; irritability to light or touch ; possession of a waxy outer layer and of a strong cuticle ; a thick sap which, owing to the hygroscopic property of its solid constituents, keeps the circulation active during the period of greatest sun-heat and dry season ; ethereal oils which gradually evaporating, produce resin, a layer of which accumulating on the evaporating surfaces, lessens the amount of transpiration ; the thick sap of plants growing in deserts, when the difference between the temperatures of day and night is very great, protects them against injury from the daily great variations of temperature ; phyllodes, and leaves occupying the position of phyllodes, being less transpirable, are adaptations to a dry climate ; presence of corky tissues which protects against frost, etc., absence of stomata, which in some cases prevents entry of thawing snow ; thickened roots, &c., which are stores of nutriment and water, and preserve life during times of drought ; besides the many arrangements by which the reproductive organs are protected from rain, dew and wind.

MY HEPATICAS.—One of the interesting things for the botanist or the gardener to do at this time of year, is to remove to some spot in his garden a few of the most attractive wild plants which abound in our woods, swamps and fields. Last year, I removed some plants of blood-root, tooth-wort, spring beauty, phlox, squirrel corn, several species of violets and several *varieties* of hepaticas. These are near the house and are a constant source of delight to the children, visitors, members of the household, and I hardly need add to the person who transplanted the flowers. These were removed as they were found with a little earth about the roots.

Two or three plants of the hepatica were chosen for the pure white of their flowers, others for their delicate pink color, others for the large size of their flowers, others for the deep blue of the flowers; still others were selected for their double flowers. This spring the hepaticas are all true in their peculiarities. One of the blue varieties has already begun to sport. One stem bore two flowers near the top and another three. On a much larger scale I am collecting plants for a wild garden on the bank of a brook and a small pond near the green-house. Here we have a variety of soil from pond to muck or dry sand; from perpetual shade to a full exposure of the bright sun. Here are ferns and grasses, some shrubs and some of the most interesting hardy wild plants. It is a favorite spot for all who live at the College.—*W. F. Beal, Michigan Agricultural College.*

BOTANICAL NOTES.—The Botanical Gazette for April, contains, among other articles, bryological notes by C. H. Austin; new species of Colorado fungi, by C. H. Peck; late Rhode Island flowers, by W. W. Bailey; Coniferæ of the Crestines, by T. S. Brandegee. The bulletin of the Torrey Botanical Club for March contains descriptions of new species of North American *Uredinei*, and an interesting table showing the dates when the leaves fall, by N. L. Britton, who states that "the female in dicæious plants appears to hold its foliage longer than the male." Caruel's New Botanical Journal (Italy x, No. 2), contains an article on the floral structure and affinities of various monocotyledonous families.

In the *Quarterly Journal of Microscopical Science* are two important papers, one by S. H. Vines, on Researches into the Nature of Lichens, and a very important paper, well illustrated, by J. C. Ewart, on the life history of *Bacillus anthracis*.

ZOÖLOGY.¹

HELIX CHILHOWEËNSIS Lewis.—I have lately had the pleasure, after a pedestrian excursion of nearly one hundred miles, over the roughest of mountain roads, to collect this rare species in its normal habitat.

¹ The departments of Ornithology and Mammalogy are conducted by Dr. ELLIOTT COUES, U. S. A.